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Taking a Radio Census of Binary Supermassive Black Holes

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We present a study that uses very long baseline interferometry to search for binary supermassive black holes at galaxy centres. Such searches are important in experimentally addressing the possibility that supermassive binaries may “stall”, and never coalesce after the merger of their host galaxies; this would have dramatic (and likely detrimental) consequences for predicted gravitational wave signals and hierarchical galaxy formation alike. We have identified only one binary in a large sample of ~3000, suggesting observational evidence against stalling and putting a limit on the post-merger inspiral time of a supermassive black hole. Conclusive measurements of this kind will require observations of a great number of galaxies with long baselines, moderate sensitivity, and thorough u,v coverage. This science is therefore ideally fit for the SKA if it includes very-long-baseline capabilities; as such we detail the necessary components for a future study with the SKA.

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